

GRADE 8 SCIENCE

Description

Grade 8 science is a heterogeneous class that meets one period per day. The major topics are properties of matter, energy, and motion.

Course Overview

Course Goals

Students should:

Essential Questions

- How does the structure of matter affect the properties and uses of materials?
- What is the role of energy in our world?
- What makes objects move the way they do?
- How does the position of Earth in the solar system affect conditions on our planet?
- How do science and technology affect the quality of our lives?

Assessments

Common Assessments

Skill Assessments

Content Outline

- I. [Unit 1](#) - Classification and Measurement of Matter
- II. [Unit 2](#) - Motion of Matter
- III. [Unit 3](#) - Physics of Orbital Cycles
- IV. [Unit 4](#) - The Use of Energy to Move Matter
- V. [Unit 5](#) - Structural Analysis
- VI. [Unit 6](#) - Practical Applications of Physical Science Concepts

Standards

[State of Connecticut Science Curriculum Frameworks](#)

Connecticut State Standards are met in the following areas:

- *Properties of Matter*
- *Forces and Motions*
- *Earth in the Solar System*
- *Energy Transfer and Transformations*
- *Science and Technology in Society*

Grade Level Skills

Students will:

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Pacing Guide

Pacing Guide										
1st Marking Period		2nd Marking Period			3rd Marking Period			4th Marking Period		
September	October	November	December	January	February	March	April	May	June	
Unit 1 <u>Classification and Measurement of Matter</u> 9 weeks		Unit 2 <u>Motion of Matter</u> 8 weeks			Unit 3 <u>Physics of Orbital Cycles</u> 1 week	Unit 4 <u>The Use of Energy to Move Matter</u> 5 weeks		Unit 5 <u>Structural Analysis</u> 2 weeks	Unit 6 <u>Practical Applications of Physical Science Concepts</u> 10 weeks	

Unit 1 - Classification and Measurement of Matter, 9 weeks [top](#)

Standards

Properties of Matter

Materials can be classified as pure substances or mixtures, depending on their physical and chemical properties.

Students will:

- describe the properties of common elements, such as oxygen, hydrogen, carbon, iron, and aluminum.
- describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they are made.
- explain how mixtures can be separated by using the properties of the substances of which they are made, such as particle size, density, solubility, and boiling point.

Unit Objectives

Students will be able to:

- compare and contrast mass and weight.
- use appropriate tools and metric units to measure and calculate various physical properties including mass, volume, density, temperature, length, boiling point, melting point, and solubility.
- differentiate between the properties of simple compounds and the elements that compose them.
- differentiate between mixtures and pure substances.
- separate the components of a mixture using physical properties such as size, density, solubility, magnetism, and boiling point.

Essential Question

- How do the properties of matter affect its behavior and uses?

Focus Questions

- What is matter?
- What are properties of matter?
- How is matter classified and measured?
- How can the periodic table be used to identify elements?
- Are the properties of elements related to the properties of the compounds they form?
- How can properties of matter be used to separate mixtures?

Assessment

- Separating a Mixture Lab

Skill Objectives

Students will:

Unit 2 – Motion of Matter, 8 weeks [top](#)

Standards

Forces and Motions

An object's inertia causes it to continue moving the way it is unless it is acted upon by a force to change its motion.

Students will:

- calculate the average speed of a moving object and illustrate the motion of objects in graphs of distance over time.
- describe the qualitative relationships among force, mass, and changes in motion.
- describe the forces acting on an object moving in a circular path.

Unit Objectives

Students will be able to:

- select and use appropriate tools and metric units to measure, calculate and manipulate distance, displacement, speed, velocity, force, and acceleration.
- identify centripetal force as the force acting on an object moving in a circular path.
- illustrate the motion of objects in graphs of distance over time.

Essential Question

- What makes objects move the way they do?

Focus Questions

- How can distance and time be used to calculate the average speed of a moving object?
- How can the motion of an object be described and quantified?
- What affects the motion of matter?

Assessment

- Super Ball Bounce Lab

Skill Objectives

Students will:

Unit 3 - Physics of Orbital Cycles, 1 weeks [top](#)

Standards

Earth in the Solar System

The solar system is composed of planets and other objects that orbit the sun.

Students will:

- explain the effect of gravity on the orbital movement of planets in the solar system.

Unit Objective

Students will be able to:

- identify gravity as the force holding planets in their orbits.

Essential Question

- How does orbital motion create cycles?

Focus Questions

- What is the effect of gravity on the orbital movement of planets in the solar system?
- How does the orbital relationship among the Earth, the moon and the sun affect conditions on our planet?

Assessment

Make a children's book

Skill Objectives

Students will:

Unit 4 - The Use of Energy to Move Matter, 5 weeks [top](#)

Standards

Energy Transfer and Transformations

Energy provides the ability to do work and can exist in many forms.

Students will:

- explain the relationship among force, distance, and work, and use the relationship ($W = F \times D$) to calculate work done in lifting heavy objects.
- explain how simple machines, such as inclined planes, pulleys, and levers, are used to create mechanical advantage.
- describe how different types of stored (potential) energy can be used to make objects move.

Unit Objectives

Students will be able to:

- use a variety of simple machines including inclined planes, pulleys, and levers to change the forces needed to move objects.
- apply appropriate tools and metric units to measure, calculate, and manipulate distance, force, and work.
- describe how energy can be used to make objects move.

Essential Question

- What is the role of energy in our world?

Focus Questions

- How is energy used to move matter?
- What is the relationship among force, distance, and work?
- How can simple machines be used to help us?

Assessment

- Shipping and Sliding Performance Task

Skill Objectives

Students will:

Unit 5 - Structural Analysis, 2 weeks [top](#)

Standards

Science and Technology in Society

In the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.

Students will:

- explain how beam, truss, and suspension bridges are designed to withstand the forces that act on them.

Unit Objective

Students will be able to:

- construct bridges and analyze how they are designed to withstand certain loads and potentially destructive forces.

Essential Question

- How are matter and energy used in the design and construction of bridges?

Focus Question

- How is knowledge of matter and energy used to construct functional and safe structures?

Assessment

- Bridge Construction

Skill Objectives

Students will:

Unit 6 - Practical Applications of Physical Science Concepts, 10 weeks [top](#)

Standards

Properties of Matter

Materials can be classified as pure substances or mixtures, depending on their physical and chemical properties.

Forces and Motion

An object's inertia causes it to continue moving the way it is unless it is acted upon by a force to change its motion.

Earth in the Solar System

The solar system is composed of planets and other objects that orbit the sun.

Energy Transfer and Transformations

Energy provides the ability to do work and can exist in many forms.

Science and Technology in Society

In the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.

Unit Objective

Students will be able to:

- explore physical science concepts through design and/or construction of structures such as: a catapult, launcher, egg drop, bridge, racer, flyer, Rube Goldberg device, etc.

Essential Question

- What are some practical applications of physical science concepts?

Focus Question

- What are some practical applications of simple machines, forces, and motion, elements, compounds, and mixtures?

Assessment

- Egg Drop

Skill Objectives

Students will: